

2012 Ground Testing Highlights

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As part of the Fundamental Aeronautics Program and a collaborative effort with Boeing and Lockheed Martin this past year a series of sonic boom tests were completed in the NASA Ames Unitary Plan Wind Tunnel (UPWT). One of the goals was to develop new test techniques and hardware for measuring sonic boom signatures in the transonic and supersonic regimes. Data for various model designs and configurations were collected and will be used to validate CFD predictions of sonic boom signatures.

Reactivation of the NASA Ames Mitsubishi compressor system was completed this past year. The compressor is intended to replace and augment the existing UPWT Clark Compressor as the primary Make Up Air (MUA) source. The MUA system provides air and vacuum pumping capability to the Ames UPWT. It will improve productivity and reliability of the UPWT as a vital testing and research facility for the U.S. aerospace industry and NASA. Funding for this task was provided from the American Recovery Investment Act (ARRA).

Installation and validation of a Noncontact Stress Monitoring System (NSMS) for the 3-stage compressor was completed at the 11-Foot Transonic Wind Tunnel. The system, originally developed at AEDC, consists of 36 pairs of LED light sources with optic beam send and receive probes along with a 1-per rev signal. The new system allows for continuous monitoring and recording of compressor blade bending and torsion stresses during normal test operations.

A very unusual test was completed in the 11 Ft TWT to acquire aerodynamic and flow field data for the Crew Exploration Vehicle (CEV) Parachute Assembly System (CPAS) to validate CFD methods and tools. Surface pressure distribution measurements and velocity measurements in the wake of the command module back to the drogues parachute location were acquired. Testing methods included Particle Image Velocimetry (PIV), Pressure Sensitive Paint (PSP), Schlieren, Infrared Imaging (IR), and boundary layer survey and skin friction measurements.